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ABSTRACT

GRADES OR AGES: Grades 7, 8, and 9. SUBJECT MATTER: Physical health and nutrition. ORGANIZATION AND PHYSICAL APPEARANCE: The guide is divided into five sections: nutritional states, adequate diet, nutrition in adolescence, the achievement and maintainance of correct weight, and environmental factors which affect nutritional health. The publication format of four columns gives the outline of content, the major understandings and concepts, suggested teaching aids and learning activities, and supplementary information for teachers. The pupil objectives are presented in the introduction. The guide is soft-covered. OBJECTIVES AND ACTIVITIES: Each subsection contains questions and topics for discussion. A list of vocabulary words follows each major section. The supplementary information provides teachers with further discussion material. INSTRUCTIONAL MATERIALS: A table of major nutrients is presented with the principle functions, food sources, and deficiency diseases related to a lack of them. A summary of school lunch standards is also presented. A bibliography of books, periodicals, and filmstrips is presented along with a selected bibliography for teachers. STUDENT ASSESSMENT: No provision is made. OPTIONS: The guide is suggestive only. (BRB)

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HEALTH CURRICULUM MATERIALS
Grades 7, 8, 9

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STRAND I - PHYSICAL HEALTH
NUTRITION

SP 006 425

The University of the State of New York/The State Education Department
Bureau of Secondary Curriculum Development/Albany 12224
1970

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FOREWORD

This publication contains curriculum suggestions for teaching Strand I - Physical Health, Nutrition, for grades 7, 8, and 9.

The publication format of four columns is intended to provide teachers with a basic content outline in the first column; a listing of the major understandings and fundamental concepts which children may achieve, in the second column; and information specifically designed for classroom teaching which should provide them with resource materials, teaching aids, and supplementary information, in the third and fourth columns. The comprehensive nature of the health program makes it imperative that teachers gain familiarity with all of the strands presently in print. In this way, important teaching-learning experiences may be developed by cross referring from one strand to another.

It is recommended that the health coordinator in each school system review these materials carefully and consult with teachers, administrators, and leaders of interested parent groups in order to determine the most appropriate manner in which to utilize this strand an an integral part of a locally adapted, broad and comprehensive program in health education.

The curriculum materials presented here are in tentative form and are subject to modification in content and sequence. Critiques of the format, content, and sequence are welcomed.

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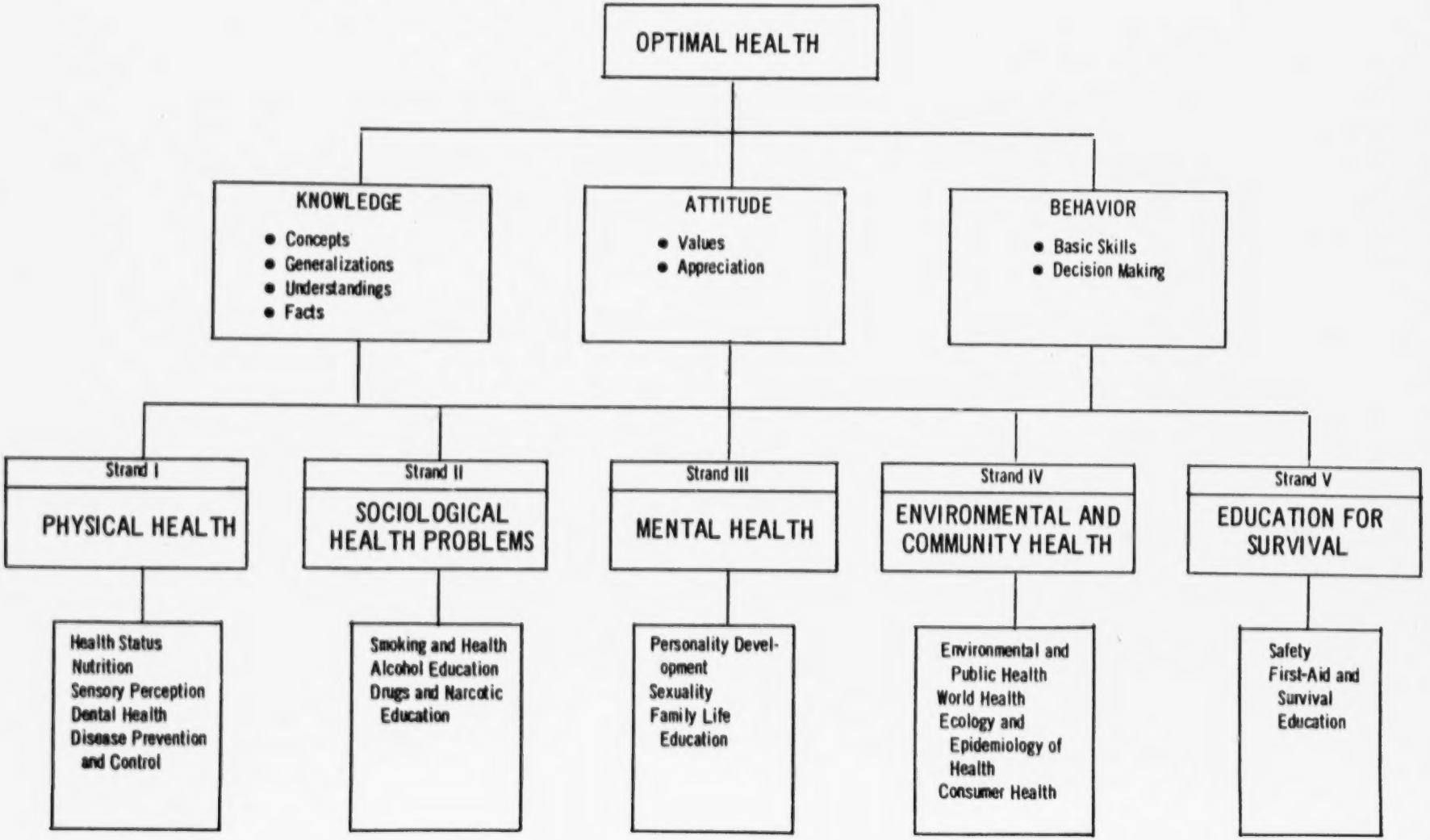
OPTIMAL HEALTH
KNOWLEDGE
• Concepts
• Generalizations
• Understandings
• Facts
ATTITUDE
• Values
• Appreciation
BEHAVIOR
• Basic Skills
• Decision Making
Strand I
PHYSICAL HEALTH
Health Status
Nutrition
Sensory Perception
Dental Health
Disease Prevention and Control
Strand II
SOCIOLOGICAL HEALTH PROBLEMS
Smoking and Health
Alcohol Education
Drugs and Narcotic Education
Strand III
MENTAL HEALTH
Personality Development
Sexuality
Family Life Education
Strand IV
ENVIRONMENTAL AND COMMUNITY HEALTH
Environmental and Public Health
World Health
Ecology and Epidemiology of Health
Consumer Health
Strand V
EDUCATION FOR SURVIVAL
Safety
First-Aid and Survival Education

NUTRITION

GRADES 7, 8, 9

Overview

The nutrition curriculum at the junior high level is directed toward helping the student explore in more detail the relationships among nutrition, health, disease, heredity, and environment, and providing the opportunity for him to apply his knowledge of nutrition to practical situations. The rapid changes which the adolescent undergoes physically and psychologically focus his attention on the practical problems he encounters. Students of this age ask repeatedly for information on weight control. They want to know how they measure up compared with others in almost every situation. Nutrition teaching should provide opportunity for the student to analyze his own practices in the perspective of sound background knowledge.

Grade levels are suggested for each teaching unit in order to form a logical progression and to take advantage of the interests and abilities of students at given grade levels. It is hoped also that repetition of identical learning experiences can be avoided as the student progresses through the grade levels.

At the end of each teaching unit a summary of key vocabulary is included. This may be used as a device for a pretest to assess students' knowledge at the beginning of the unit, or as a summarizing device for review, or simply for teacher reference.

Pupil Objectives

Pupils in grades 7, 8, and 9 should:

- understand the relationships among nutritional behavior and physical, mental, and social attainments.
- realize that food choices are influenced by the personal experiences and concerns of the individual.
- understand that all people need the same nutrients, but quantitative requirements differ for each individual depending on factors such as age, sex, growth, activity, and environment.
- know the consequences of eating habits which are not adequate nutritionally.
- apply their knowledge of nutrition when they have the opportunity to choose their own food.

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OUTLINE OF CONTENT	MAJOR UNDERSTANDINGS AND FUNDAMENTAL CONCEPTS	SUGGESTED TEACHING AIDS AND LEARNING ACTIVITIES	SUPPLEMENTARY INFORMATION FOR TEACHERS
I. Nutritional Status	Nutritional status is an integral part of physical health.		
A. Adequate nutrition as essential for optimum health	It is impossible to be in good health without being adequately nourished.		
1. Need for food energy and nutrients	The body requires food energy and nutrients to carry on its vital functions, to build new cells for growth and repair, and to supply energy for physical activity.	Use parts of the book *Food Becomes You* by Ruth Leverton, as a basis for discussion and review of the role of nutrition in health. Chapters I (Food's the Thing), II (Food Habits), and VIII (The Nutrients) provide a good introduction and overview.	
2. Utilization of nutrients by the body	The human body is well equipped to digest, absorb, and utilize nutrients from food.	Read Part VII, "The Digestive System: Fuel Refinery for a Chemical Engine," in the booklet *The Wonderful Human Machine*. (American Medical Association). Read "Miracle of Digestion," and "The Human Nutrition Machine," pages 80-101 in the book *Food and Nutrition* from the LIFE Science Library.	
B. Dynamic state of the body	A state of dynamic balance exists with regard to intake and outgo of food energy and nutrients by the body.	Discuss what is meant by the term "dynamic balance." What constitutes a dynamic state as opposed to a static state?	An object in a dynamic state is doing some kind of work, and is using some kind of energy to do that work.

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		Classify objects as dynamic or static. For each dynamic object mentioned, identify the kind(s) of work being done and the energy being transformed. Discuss what happens when the dynamic state in a living organism ceases and a static state ensues. (The organism dies). Discuss what happens in a dynamic state if the energy supplied is too much or too little for the amount of work to be done.	Examples of objects in a dynamic state: a moving train, a growing plant, an electric light bulb when lighted, a muscle being flexed, the body digesting food.
1. Dynamic balance of intake and outgo of food energy	A deficient or excessive intake of food energy (calories) results in poor nutrition health.	Students can plan and carry out a demonstration to show that no work can be done unless a dynamic state exists.	
a. Determinants of need for food energy	Food energy is needed to maintain vital functions and carry on physical activity. Food energy may be derived directly from food or from stored energy (body fat) which was derived from food previously eaten.	Discuss: - What are the effects of taking in too little food energy for needs? - What are the effects of taking in too much food energy for needs? - For what reasons might a person take in too little or too much food energy? - How does increasing or decreasing physical	Too little food energy for needs results in loss of body tissue, lassitude, a decreased metabolic rate, and eventually death if the deficit is severe enough. Too much food energy results in the deposition of body fat, weight gain, and the associated health risks. The reasons a person may take in too much or too

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		exercise affect the dynamic state of energy balance?	little food are many and complex. Not only does availability of food make a difference, but also emotional reasons and very high or very low needs for calories can contribute. Exercise can be the most effective way of restoring energy balance for the person with low calorie needs. Usually a combination of reduced food intake and increased exercise is the most effective way of restoring energy balance.
b. Individual variation in need for food energy	Individuals vary a good deal in their requirements for food energy. Body size, sex, rate of growth, physical activity, and individual metabolic rates all affect calorie needs.	Debate: The fact that the body can store food energy in the form of body fat is a useful thing.	
2. Nutrient deficiencies	Deficiencies of protein, vitamins, and minerals cause poor health and, if extreme, cause clinical disease.		
a. Symptoms	Symptoms of nutrient deficiencies are related to the functions of the nutrient in the body.	Read "The Great Vitamin Mystery" and "Campaign Against a Child Killer," pages 102-125 in the book *Food and Nutrition* from the LIFE Science Library.	
		Individual students or groups of students may be assigned a specific nutrient to investigate. They should be able to report to the class on the functions of the nutrient, the disease or symptoms caused by deficiency, and something about the history of the	This section on nutrient deficiencies should be regarded as an overview, not a body of knowledge to be memorized. While students may be interested in the extreme forms of deficiency diseases, it is important that this subject be put in its proper perspective.

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		disease. Alternatively, students may be asked to look up and report on a deficiency disease. They then should identify the nutrient involved, food sources of the nutrient, and something of the disease's history. The table in Appendix I will serve as a summary. Additional information may be found in: - Encyclopedias - *A Food Value Wheel* (Cooperative Extension leaflet describing nutrient functions and sources) - Chapter VIII of *Food Becomes You*, by Ruth Leverton. - *Principles of Nutrition* by Wilson, Fisher, and Fuqua. Elementary nutrition text, shows some pictures of animals with deficiencies. - *Food--What For?* (Cooperative Extension workbook on teenage nutrition. Lesson #3 contains a table of nutrients, functions, and food sources.)	Deficiencies of important nutrients do occur commonly in the underdeveloped areas of the world. Even then, however, acute deficiencies of a single nutrient are far less common than milder, chronic deficiencies of several nutrients at once. Recent studies show that the U.S. population is not uniformly well nourished but that frank deficiency conditions are not common. Studying the extreme effects of malnutrition should not leave the student with the impression these diseases are imminent if he does not eat the prescribed foods every day. Nutritional deficiencies take time to develop, and since nutrition is a long-term affair it takes a chronic, consistent lack of a vital nutrient to produce illness. Teaching about nutrient functions will not be credible unless it puts deficiency diseases in perspective.

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b. Progress	Progress of a nutritional deficiency: - The first step is a lowering of nutrient stores in the cells. Some nutrients are stored in the body to a greater extent than others. (For instance, vitamin A is stored in the cells of the liver. If a person is in good vitamin A nutriture, it would take many months to develop a clinical deficiency even on a diet free of vitamin A. Scurvy on the other hand, develops more rapidly because vitamin C storage in the body is very limited. - When stores of the nutrient are exhausted, cellular function may begin to be impaired. Biochemical measures can detect lowered nutrient levels in the body tissues. These are measured most often in the blood or the urine. - Clinical signs and symptoms of deficiency disease occur last.	Use selected slides from the slide set *How Food Affects You* (USDA) to relate nutrients to cellular functions. The Daily Food guide recommends eating a vitamin C source every day, and a vitamin A source only several times a week. Discuss the reasons for this difference in recommendation. Discuss: If a famine were to occur, would it make a difference whether the people had previously been well nourished or only marginally nourished? Stress increases the need for many nutrients. Examples of stress include emotional upset, a growth spurt, pregnancy, illness, or fever. Would it make a difference to the health of a person subjected to a stressful situation whether he had previously been marginally nourished, or had been well nourished throughout his life? Why?	An individual classified as marginally nourished would not display clinical signs of deficiency, but neither would he have much in the way of tissue stores of nutrients. "Stress," in a biological sense, is any condition which imposes extra demands on the organism. It may be of either a physiological or psychological nature.

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c. Vulnerability of growing organism to deficiencies	Growth increases the need for nutrients and food energy. Individuals who are growing show the effects of an inadequate food supply more quickly than the rest of the population, because their needs are greatest. These individuals are thought of as "nutritionally" vulnerable.	Which of the following would you consider to be nutritionally vulnerable groups of people? Why? - Unborn children - Infants - School children - Adolescents - Adults - Pregnant women	
3. Nutrient excesses	Excessive intakes of some nutrients can cause illness.		
a. Hypervitaminoses	Some vitamins, if ingested in large quantities over a period of time, can cause serious illness. These conditions are known as hypervitaminoses. The vitamins which can cause difficulty are the fat soluble vitamins A and D. They are stored in the body and excesses cannot be excreted in the urine, as is the case with water soluble vitamins.	Have students discuss the idea..."If a little of something is good for you, it is not always true that a lot must be better." Discuss: Are vitamin pills the same as drugs? How are they similar? How are they different? Should vitamin pills be treated the same way as drugs? If vitamin pills are present in the house, how should they be stored?	Vitamin pills or capsules can be regarded as drugs. Vitamins found in foods, if the person eats an adequate diet, are sufficient to meet the needs of most healthy individuals. If there is a need for supplemental vitamins and/or minerals for a specific reason, a physician will prescribe them. In the absence of a physician's recommendation, there is no reason to take vitamin pills.
b. Sources of toxic intakes	The levels found in food are not high enough to result in toxic intakes of nutrients. Incidents of hypervitaminoses occur mainly from overdoses of multivitamin pills or drops.	Read the pamphlet *Vitamin Supplements and Their Correct Use*, from the American Medical Association.	

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			Like any drug, multivitamin pills are dangerous, if consumed in large quantities. They should always be kept out of the reach of children (never left on the kitchen or dining room table.)
C. Nutritional Status	An individual's nutritional status is determined by an interaction of his nutrient intake with heredity, disease, environment, and physical activity.		
1. Factors which influence nutritional status	How well nourished a person is depends not only on the food he eats, but also on his needs for nutrients and how well his body uses the food he eats.	Caloric needs increase with body size and activity. Protein needs depend on growth rate and body size, not on activity. How would adequate diets differ for two men of the same height and weight and age, one engaged in a strenuous occupation and the other with a sedentary job?	It is important that nutrition be considered as an interaction between man, his food and environment. Nutrition does not operate in a vacuum, but is an integral part of the dynamic equilibrium which composes good health. Students should appreciate the vital role of food in life, but should understand how it affects and is affected by other factors.
a. Nutrient needs	Need for nutrients varies with body size, age, sex, growth rate, activity level, and individual heredity variations. Nutrient needs are increased by infections and by the presence of parasites.	Hookworm parasites are a common problem in much of the tropical parts of the world. The infection causes internal blood loss. How would this affect the individual's needs for nutrients in order that he remain in good nutritional health? (Assuming it's not possible to rid him of the parasites.)	Malnutrition and disease work in a synergistic relationship. The malnourished individual is more susceptible to infection and less able to recover quickly; the disease may aggravate the malnutrition due to loss of

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			appetite, impaired absorption, or cultural traditions of withholding food, or some types of food, from the diet of a sick person.
b. Effects of disease	Many diseases affect the absorption, utilization, or need for nutrients. Special diets are a great help in the treatment of some diseases.	Invite a physician, a dietitian, or a public health nutritionist to talk with the class about diseases such as diabetes, phenylketonuria, hypertension, and overweight, in which diet is a significant part of the treatment. Discuss the special needs of a person who is allergic to wheat protein. What modifications must be made in his diet? What foods could replace the ones he cannot eat?	
2. Interrelationships among nutrients	Needs for some nutrients depend on intakes of other nutrients. That is, nutrient needs are interrelated. For example, the need for thiamine increases as total calories, and especially carbohydrate, increases. As another example, the amino acid tryptophan (from protein) is converted partially in the body to the	Discuss what is meant by the term "a well balanced diet." Is a balanced or adequate diet exactly the same for every individual?	"Balance" refers to a long-term state of appropriate quantities of nutrients. The individual, his environment, and the foods he eats affect his needs for specific nutrients.

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	vitamin niacin. Therefore, the requirement for niacin is less if a larger amount of protein (and thus tryptophan) is consumed.		
D. Measurement of nutritional status	Nutritional status can be measured.	• Use the film or video-taped program "Food--for Health" from the series *Food--What For?* (Cooperative Extension). Shows a study of nutritional status of teenagers, including measurement of height and weight, taking blood samples for hemoglobin measurements (a measure of iron nutritive) and dietary evaluation.	Tissue samples are the most direct way of measuring nutritional status. Such techniques as liver biopsies and bone marrow sampling are informative, but cannot be used on a large population because they are difficult, costly, and uncomfortable to the subject. Blood sampling allows measurement of nutrients in transport in the body. Urine analyses usually measure either excess amounts of a nutrient or breakdown products of a nutrient.
1. Methods	Methods A general clinical examination by a physician will uncover overt signs of nutrient deficiencies. But there are other, more subtle measurements that can tell a good deal about nutritional health. - One indication of adequate nutriture in children is growth progress, measured by change in height and weight. - Biochemical measurements of nutrient levels in blood and/or urine give information about nutritional status. - Dietary survey (by observation, or by asking the subject to recall what he has eaten or to keep a record) serves as an indicator of nutrient adequacy.	Ask the school nurse or a public health nurse to visit the class and demonstrate how hemoglobin determinations are made. Perhaps hemoglobin analysis can be done for the entire class. (The procedure is simple and rapid, and a few drops of blood from a fingerprick sample is sufficient.)	Accuracy and interpretations vary. For instance, blood vitamin A levels reflect long-range intakes of vitamin A and are not much affected by day-to-day fluctuations. Hemoglobin levels, however, respond relatively rapidly (in a matter of days or weeks) to a change in iron intake.

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2. Application a. Nutrition surveys in other countries	Application Nutrition surveys, using clinical, biochemical, and dietary information to determine how well or poorly fed people are, have been done in many countries of the world. - In the underdeveloped areas of the world, protein and calorie shortages are often severe. Vitamin deficiencies also are common, especially vitamin A. Young children are the most vulnerable to nutritional illness, since their needs are high and they are at an age when the food provided is likely to be inadequate.	Read *The Puzzle of Food and People* (UNESCO) - Paperback, 57-page reader discusses the problem of feeding the world's population.	For further information on nutritional problems in developing countries, see *Child Nutrition in Developing Countries*, by Derrick B. Jelliffe, from the U.S. Government Printing Office, Washington, D.C. $1.25.
b. Nutritional status USA (1959)	In the United States, a survey of nutritional status was made during the late 1940's and 1950's. (Nutritional Status, USA). The survey, published in 1959, showed the U.S. population to be generally well nourished. The most common problems were overweight, and lower than desirable intakes of iron, calcium, vitamin C, and vitamin A. The groups most likely to	Compare and contrast the nutritional problems in the U.S. with those of a developing nation. Discuss the reasons for nutritional problems in the U.S.	

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	have lower than desirable nutrient intakes were teenagers (especially girls), and young women.		
c. National Nutrition Survey	In 1968 U.S. Department of Health, Education, and Welfare began conducting a National Nutrition Survey to determine the nature and extent of malnutrition in the U.S. Specifically, the survey concentrates on the low income population in the U.S. For the first phase of the study, Texas, Louisiana, New York, Kentucky, Michigan, California, Massachusetts, and South Carolina were selected to be studied. In December of 1969, results from the New York survey were not yet available; results from Texas, however, show a higher incidence of nutritional deficiencies than had been thought to exist. Specifically, growth retardation, anemia, and goiter were found often. A few cases of rickets, protein-calorie malnutrition, and other deficiencies were found. Dental caries were extremely common.	Discuss: Do you think that a survey of the nutritional status of the U.S. population is needed at this time? Why or why not? What do you think might be the results of such a survey in terms of action by the government? Consult with the local health department, public health nutritionist, or physician to identify local health problems and their nutritional implications.	The results of the National Nutrition Survey in Texas are summarized in the article "Are We Well Fed?... The Search for the Answer" in *Nutrition Today*, Volume 4, Number 1 (Spring 1969), (By Arnold E. Schaeffer, and Ogden C. Johnson.) Available from NUTRITION TODAY, 1140 Connecticut Avenue, N.W., Washington, D.C. 20036. The teacher should watch for the release of results from the New York State Nutrition Survey to obtain a profile of the State's nutritional status.

KEY VOCABULARY:

Absorption	Biochemical	Body tissues
Calorie	Clinical	Deficiency
Digestion	Disease	Dynamic
Environment	Heredity	Hypervitaminosis
Infection	Marginally nourished	Metabolism
Nutrient stores	Nutritional status	Nutritional status survey
Parasites	Requirements	Sedentary
Stress	Vulnerable	

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II. What is an adequate diet?	While nutritional status can only be assessed using clinical, biochemical and dietary methods, we have some standards for measuring the adequacy of people's diets. These are based on average requirements for individuals of a given age and sex.		The publication *Recommended Dietary Allowances, 7th Edition, 1968* is an especially valuable reference. Not only are the RDA's enumerated, but each nutrient is discussed individually and the philosophy of the standards is made clear.
A. Criteria for assessing dietary adequacy			
1. Recommended dietary allowances	The Recommended Dietary Allowances are recommendations for daily amounts of nutrients for people in given age and sex groups in the United States. These recommendations are higher than requirements to allow a margin of safety, and are revised every five years. They are published by a committee of scientists from the Food and Nutrition Board of the National Research Council, National Academy of Sciences. The recommendations are used for planning food supplies and evaluating diets of groups of people. They are not meant to be hard and fast standards for individuals.	Discuss: Why do you think the Recommended Dietary Allowances need to be revised periodically?	Requirements (often expressed as Minimum Daily Requirements) are based on average physiological needs. Recommended Dietary Allowances are set higher than requirements to allow for individual variation and for normal stress. The RDA are designed to provide good nutrition for practically all healthy persons in the U.S. Other countries also develop standards for the purposes of dietary planning and evaluation. Each country has its own philosophy about what basis it will use for its standards. Some of these recommendations are listed as an appendix to *The Recommended Dietary Allowances, 7th Edition.*

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2. The basic four food groups	The "Basic Four Food Groups" is a guide, based on the RDA, for foods to be eaten to provide an adequate diet. The division into Food Groups is on the basis of their nutrient content. The groups are:	The poster "Foods to Eat" from the New York State Department of Health illustrates the foods contained in each of the four groups. The poster "A Guide to Good Eating" (Dairy Council) also pictures the four groups.	This section should not be presented for rote memorization of the food groups, but rather as an opportunity to analyze the reasons for the recommendations. The Basic Four should be considered only as a guide and a tool.
a. Milk group	The milk group (milk, cheese, cottage cheese, ice cream, buttermilk) contributes calcium, vitamin D, riboflavin, and protein to the diet. At least four servings a day are recommended for teenagers.	The workbook *Food--What For?* (Cooperative Extension) contains in lesson #2 ("Food--for Health") an explanation of the recommended amounts from the four food groups for teenagers, and some problems to solve based on the information.	Many sources place the meat group first, milk second, fruits and vegetables third, and breads and cereals last. Here the order is rearranged purposely to emphasize relative importance. Studies show that the type of food that Americans are least likely to slight is meat. On the other hand, many people (especially teenagers) are likely to have low intakes of calcium and iron. Further, the combination of milk products and cereal products in a meal produces a good quality protein meal, and is probably the best food value for the money of any combination. This can be quite important when money is limited. Therefore, we have placed the milk group first, followed by the bread and cereal group. We have placed the meat group last

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			because it does not appear to need emphasis for most people.
b. Bread and cereal group	The bread and cereal group (all enriched and whole grain breads and cereals) is important for food energy and iron and the B vitamins thiamine, riboflavin, and niacin. Whole grain breads and cereals are natural sources of these nutrients. Milling grain to make white flour removes some of the nutrients, and enrichment simply means restoring the nutrients to the flour. At least four servings a day are recommended for teenagers.	Have students examine labels of bread and cereal products to discover whether they are enriched or whole grain. Discover what types of bread and cereal products must be enriched by law.	In New York State, the law requires that white flour and white bread and rolls (except sweet rolls) be enriched. Rice, grits, and pasta such as spaghetti and macaroni may or may not be enriched -- have students check the label to find out. Sweet rolls, doughnuts, cookies, cakes, and crackers are almost always made with unenriched flour.
c. Fruit and vegetable group	The fruit and vegetable group includes all fruits and vegetables, and contributes mainly vitamins A and C to the diet. Some vegetables and fruits are good sources of minerals and good energy foods, but their primary importance is their content of vitamins C and A. Good sources of vitamin A are the yellow vegetables like pumpkin, carrots, and winter squash. Good sources of vitamin C include citrus fruits and juices, tomatoes and tomato juice, raw cabbage,	Have each student list all the fruits and vegetables he has eaten in the last 24 hours. Compile a list for the class, and find out how many different fruits and vegetables were eaten. List the vitamin C sources and the vitamin A sources separately.	Resource material. *Nutritive Value of Foods.* Home and Garden Bulletin #72. USDA. U.S. Government Printing Office. Washington, D.C. $.25. *Vitamin A in Fruits and Vegetables.* *Vitamin C in Fruits and Vegetables.* N.Y.S. Department of Health, 84 Holland Ave., Albany, N.Y.

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	melons, strawberries, green pepper, and potatoes (potatoes are not as good a source of vitamin C as the others listed, but may be important because of the quantities eaten by some people. French fries and potato chips have little vitamin C, because it is lost in the preparation of these products).		
	A vitamin C source should be eaten every day, and a good source of vitamin A should be eaten several times a week.	The differing recommendations for vitamin C sources and vitamin A sources are based on the fact that vitamin A being fat soluble can be stored in the body, while vitamin C cannot. Vitamin C is water soluble, and an excess will be excreted in the urine. Have students think of a way to demonstrate the fat-or water-solubility of various substances.	Some sources recommend four servings of fruits and vegetables a day. This is based on the theory that four servings a day will probably provide enough variety that adequate vitamin C and A will be consumed. Actually four servings are not necessary if the one or two vegetables or fruits eaten supply vitamins A and C. Variety is desirable, but not essential. For those on limited incomes, this has some importance. Two well-chosen vegetables and fruits (cabbage and carrots; tomato and spinach; citrus and sweet potato) are adequate.

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d. Meat group	The meat group might be more accurately called the "protein group," for it includes other protein foods besides meat: fish, poultry, eggs, dry beans, and nuts (including peanut butter.) At least two servings a day are recommended for teenagers.	Discuss: What protein sources might a vegetarian be able to rely on?	
		Think of foods which do not fall into any of the four categories mentioned above. What are they? Why are they left out of the Four Food Group classification?	Foods such as butter, margarine, sugar, soft drinks, coffee, candy, jam, sweet desserts have been left out. These foods contribute calories to the diet, and sometimes some other nutrients as well. But they are not reliable sources of nutrients, and in the American dietary pattern they do not need emphasis.
B. Nutrition education tools to help people choose adequate diets	The four food groups are tools for nutrition education in the United States. Other countries have devised similar tools, which differ because of the foods available and because of traditional eating habits in the area.		The aim of this section is to put the Basic Four in perspective as a guide to be interpreted by individuals in individual circumstances. By studying nutrition education tools used in other areas, the student should evolve a concept of the different circumstances which condition nutrition problems and the diversity of food habits in different areas.

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1. In Guatemala	For example, in Guatemala, there are three food groups: Cereal and Roots Fruit and Vegetables Animal Protein Foods There is no need for a "milk group" because sufficient calcium is supplied from cheese (classified as animal protein food) and from tortillas. Tortillas are the type of bread eaten in Guatemala. They are made from corn, which is ground in a limestone bowl with limestone utensils. The limestone contributes a great deal of calcium to the tortilla flour.		Nutrition education tools such as those described here are based on: (1) the food available in the area, (2) the traditional food patterns of the population, (3) the nutritional needs and problems of the population. In the development of nutrition education tools, an effort is made to make them as simple as possible. Familiar foods are used as the examples. (For instance, in the U.S. bread and cereal group, bread is usually the predominate food pictured. In the similar food group in the Thai food picture, rice is the primary focus.) It is well recognized that efforts to change food habits are best accepted when they reinforce and accept traditional food practices. It makes more sense to promote eating other foods in addition to rice and beans in Puerto Rico than it does to advocate replacing rice and beans with other foods.

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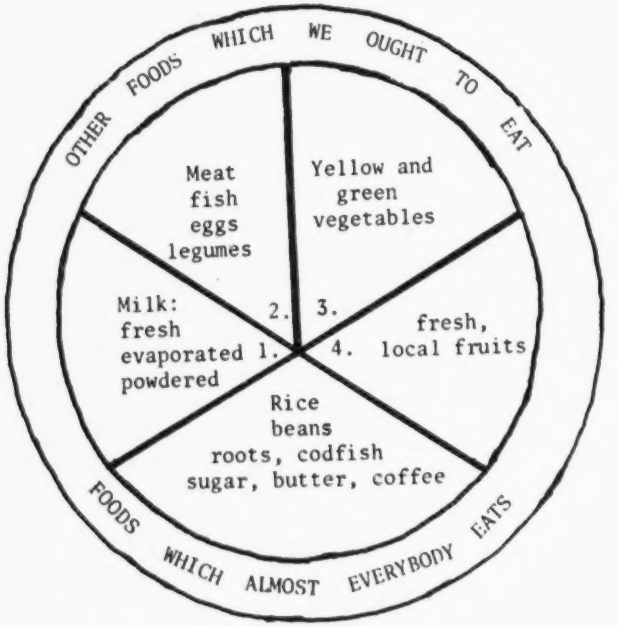
2. In Puerto Rico	As another example, in Puerto Rico the nutrition teaching guide looks like this:	Discuss: Would the approach used by Puerto Ricans (some foods which everybody eats; other foods which we ought to eat in addition) work in the U.S.? Why or why not?	In the United States, it is an accepted cultural value that variety in diet is desirable. Many Americans would complain loudly if served the same dishes for dinner every day for a week. In many cultures, however, monotony in diet is valued. A meal is not a meal in many parts of Asia, for example, unless rice is included. In some institutions in Thailand, the cost of feeding individuals is figured on the basis of food excluding rice. It is simply assumed that everyone must have plenty of rice. In a culture where one or more foods are so much a part of the way of life that everyone can be assumed to eat them regularly, there is no need to emphasize these foods -- but there is need to acknowledge the fact that the traditional foods are good foods.



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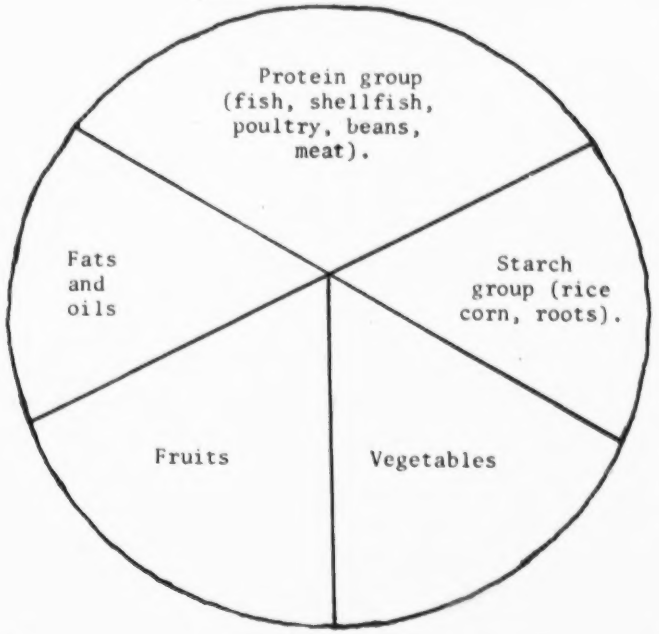
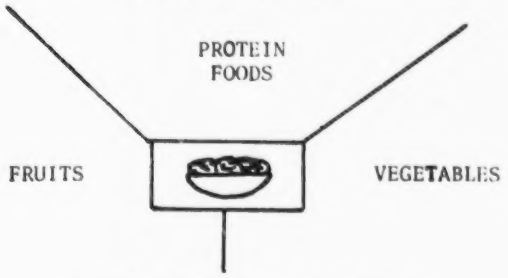
3. In Thailand	In Thailand, the following guide is used:		Fats and oils are included in the Thai guide in order to provide enough fat for the absorption of vitamin A. Vitamin A is fat-soluble and cannot be absorbed without a minimal amount of fat in the diet. Note that the protein sources in Thailand (primarily fish, beans, shellfish, and poultry) are lower in fat than in the U.S. where we depend primarily on meat.



4. In Burma

In Burma, the guide for nutrition teaching is this:



From each of the nutrition guides given, what can you tell about the foods that are available in Guatemala, Puerto Rico, Thailand, and Burma?

Rice is a staple food in the diets of Puerto Rico, Thailand, and Burma. Note the different treatments given to rice in each of these countries' nutrition education guides. Which type of treatment do you

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		think would be the most effective? In small groups, devise a nutrition education tool for the following populations: a) A tropical country with rice as the staple food, eaten at every meal. Principal protein sources besides rice are small fish (often eaten whole), fish paste, and fermented soybean products. Fresh vegetables and fruits are available in abundance. Milk is usually not safe unless canned or powdered, and is not well accepted. Most of the population cannot read, so you will have to make your guide pictorial. b) A European country where a variety of foods is available on the market. Wheat bread is the staple (whole grain.) Favorite foods include white potatoes, pork, fish, cabbage, cheese, butter, sour milk and sour cream, sweets and fresh fruit in season. You may assume that this population is literate.	Considerable calcium can be obtained from the bones of small fish and from green leafy vegetables.

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5. In the United States	The U.S. Guide (Basic Four) may need to be modified in particular circumstances, since the U.S. is far from homogeneous in terms of culture and food habits.	Students can try to modify the Basic Four to make it more meaningful to Black Americans, Mexican Americans, Oriental Americans, or other groups especially if these groups are represented in the class.	
C. Adequacy of teenagers' diets	Are teenagers well or poorly fed?		
1. Eating habits	Teenagers are often criticized for their eating habits. Frequent snacks, skipping meals, fad dieting, unorthodox combinations of foods, and eating unusual foods at particular meals are some of the targets for criticism. Some of these practices (skipping meals, fad dieting) are actually harmful nutritionally. Others (snacks, for instance) may be of benefit from a nutritional point of view. Some practices (such as unorthodox combinations of foods) are neither harmful nor beneficial in themselves, but draw criticism simply because they represent a different way of doing things.	From the students' personal experience, list aspects of teenagers' eating practices which draw criticism from adults. It may be interesting for students to interview their parents to ask specifically what they think is wrong with the way teenagers eat. In class, discuss possible reasons for each criticism. In each instance, is the practice nutritionally harmful, or does it cause inconvenience to other people, or does the adult see it as a sign of independence and/or rebellion, or is it simply different from the adult's practice?	It is important in approaching this subject that the teacher remain non-judgmental and refrain from putting students' attitudes and practices in a moralistic context. Some "typical" teenage eating practices may be harmful, but often they are only different. Adult criticism only tends to reinforce the motives for being different and asserting independence. There is nothing wrong with spaghetti and meatballs for breakfast, for example, even though many adults shudder at the thought. In helping to see the reasons for adult reactions, teenagers may come to see their own attitudes in a better perspective and to sift out the harmless practices from those that

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			affect their nutritional health. This is an excellent topic for a newsletter or program for parents. The results of the students' survey of their parents' criticisms of their eating patterns might form the basis for a program or newsletter which can help parents to differentiate between eating behavior that is potentially harmful and that which is not (and to realize, for instance, that frequent snacking may be the only practical way to meet the high energy needs of a youngster in the middle of the adolescent growth spurt.)
2. Studies of teenagers' nutritional status		What do studies of teenagers' nutritional status show?	
a. Nutritional Status U.S.A. (1959)	The study Nutritional Status USA (published in 1959) showed teenagers, and especially teenage girls, to be the poorest fed members of the U.S. Population. This study formed the basis for much of the concern over teenage diets that still exists.	Discuss: Why is nutrition important during the teenage years? Some reasons include: - High nutrient needs due to rapid growth. - Need for positive good health to meet the demands of school and social life.	For more background, see "The Paradox of Teenage Nutrition," by Ruth M. Leverton. *Journal of the American Dietetic Association* 53: 13-17 (July 1968.)

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	Recent evidence indicates that teenage diets are not that bad.	- Teenagers will soon be the next generation of parents; their health will affect their children. - Food habits formed during the teen years may persist for a lifetime.	
b. Recent studies	More recent studies of various teenage populations indicate the following general situation: . Most teenagers are well-nourished, healthy individuals. . Many teenagers are concerned about their weight (often girls want to lose, boys want to gain). . Snacking is common, and in most cases is a benefit to the diet. . Diets are most often poor when less than three meals a day are eaten. . Girls, because they need fewer calories than boys, tend to have more trouble getting an adequate intake of nutrients. . The nutrients most often in short supply are iron and calcium, with the lack of vitamins C and A sometimes showing up as problems too.	Discuss why some food in the morning is important. Discuss reasons for skipping breakfast, and ways of making breakfast easier to eat, remembering that the menu needn't be traditional. Students might make their own "instant breakfast" from milk, a raw egg, and fruit juice or jam for flavoring. Compare this cost and the time to prepare an "instant breakfast," a commercial "instant breakfast," and a "traditional menu" of cereal, toast, juice, and milk. Also compare the dishes or utensils and equipment needed.	Most problems of teenage nutrition reflect the general problems of the U.S. population, but may be accentuated by the high nutritional needs of adolescents. Weight control, low or nonexistent stores of iron in females, and possible low intakes of calcium, vitamin C, and vitamin A parallel nutritional problems in the general population. In addition, the intense concern of adolescents with their own bodies provides particular vulnerability to fad dieting. As in the rest of the population, there is evidence that teenagers from lower socioeconomic backgrounds consume less adequate diets than their more affluent peers. All this notwithstanding, American teenagers as a group are relatively well nourished. An approach

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		Distribute the one-page leaflet *Let Breakfast Fight Your Battles*, (from the Timely Tips Series, American Medical Association.)	of supportive encouragement, with suggestions and reasons for improvement where warranted, will be more effective than condemnation of present eating habits.
		Have students keep a three-day food record. Using the records, carry out the following activities: . Each student evaluates his own food record on the basis of the recommended numbers of servings from the four food groups. Tabulate, for the class, which food groups were most often slighted. Tabulate separately for boys and girls. . After identifying the food groups most often slighted, identify the nutrients that would therefore be likely to be low. List foods which are good sources of these nutrients. . Use food records (possibly a randomly selected sample of anonymous records) for class discussion and suggestions for improvement. Remember that it is not essential that foods be eaten in structured	A three-day food record should be kept in a notebook carried by the student. It should begin when he gets up in the morning of Day 1 and continue until he gets up on the morning of Day 4. One weekend day should be included, since most of us eat differently on the weekends than during the week. Students should not change their eating habits, but rather simply record their normal eating pattern. Everything put in the mouth and swallowed (except water) should be noted. Record the type of food, how it was prepared (raw, boiled, fried, etc.), the approximate amount, and when the food was eaten. Be sure to include butter, jam, etc. that are used as condiments or with other foods. A handy record form may be found in the workbook *Food--What For?*

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		meals or at usual times; evaluate only on the basis of nutritional adequacy. . Identify the practices which are most often associated with the best and the poorest diets in the class (in terms of meals, snacks, etc.). . If the records reflect a school lunch program, figure out what approximate percentage of the day's intake came from the school lunch. If some students participated in the school lunch program and others did not, compare the value of the lunches eaten by the two groups.	(Cooperative Extension) or students can devise their own form.
3. Nutritional concerns of teenagers	Teenagers are individuals, each with his own particular needs and concerns with regard to food.	Read the booklet *They Ask Why*. (Dairy Council.) Includes questions and answers on many subjects of concern to teenagers. Read the leaflet *Your Food: Chance or Choice?* (Dairy Council)	
a. High nutritional needs	Nutritional needs are high during the teen years, due to rapid growth and development during adolescence.	Discuss: Girls usually experience the adolescent growth spurt at an earlier age than boys do. What implications does this have for their eating habits?	

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		The subject of nutrition and growth is treated more fully in Unit III (NUTRITION IN GROWTH AND DEVELOPMENT: ADOLESCENCE) (Suggested for Grade 8.)	
b. Optimal health	Good nutrition is essential for the positive good health that teenagers need for appearance, energy, and well-being. Adequate nutrition is also essential for long-term good health.	Read the leaflets: *Can Food Make the Difference?* (American Medical Association) *Your Age and Your Diet.* (American Medical Association) Food Choices: *The Teenage Girl.* (The Nutrition Foundation) *Personality Plus through Diet: Foodlore for Teenagers* (Public Affairs Pamphlet #299)	See the article "An Eye to the Future: Healthy Eating for Our Teenagers" by F. J. Stare and J. Dwyer, in *Health News* (April, 1969.) From the New York State Department of Health, Albany. Also in the same issue see "Adolescents' Medical Care Today," by J. R. Gallagher.
c. Body weight	Many teenagers are concerned about their body weight.	The subject of weight control is treated more fully in Unit IV (WEIGHT CONTROL) suggested for Grade 8. At this point, it may be sufficient to point out, using the food records as a basis, that it is more difficult for the person trying to lose weight to obtain an adequate diet in terms of nutrients.	

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d. Acne	Many teenagers suffer from acne.	Invite a local pediatrician or dermatologist to speak to the class and answer questions about skin problems of adolescents. Distribute the one-page leaflet *Aid For Acne* (from the Timely Tips series, American Medical Association).	Many teenagers avoid foods that they need and that do not necessarily aggravate acne conditions (most often milk) because the foods have acquired a reputation for contributing to skin problems. There is no evidence that any specific food will make the condition worse, except in specific cases where an individual is sensitive to a particular food. Acne basically is a disorder stemming from the rather sudden production of hormones and development of sebaceous glands during puberty. Oily skin and skin eruptions can be aggravated in some individuals by particular foods but the disorder is not caused or cured by any dietary practice. Mild cases can usually be controlled by scrupulous cleanliness, sufficient rest, and a varied diet. Severe cases should be treated by a physician. He may have specific dietary recommendations to make, taking the individual patient into account.

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			Before inviting a physician to speak on this subject, it may be wise to try to ascertain what local medical practice is on the treatment of acne. There is some difference of opinion over whether iodine in the diet may aggravate acne cases. In the opinion of many nutritionists and physicians, restriction of iodized salt is not called for in treatment of acne especially in a goiter area.(Parts of New York State are goiter areas because of the low natural iodine content of the soil.) The health risk from idoine deficiency outweighs any risks from a possible aggravation of an acne condition. However, some physicians do restrict iodized salt in severe cases of acne.
e. Athletic performance	Some teenagers (boys especially) modify their diets to conform to what they hear will increase their athletic performance.	Collect ideas or beliefs about the effects of food on physical performance. Discuss their value, physiologically and psychologically, to the athlete. Do any of these ideas do any harm? A striking example is in the case of dieting to meet weight standards for wrestling weight classifications.	As far as it is known, there is no reason to believe that a special diet will enhance athletic performance. An adequate diet providing ample food energy, protein, vitamins, and minerals is essentially the same for the athlete as for any other individual except for the athlete's increased need for calories due to

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		Attempts to keep just under or just over an arbitrary weight for wrestling purposes can result in some really bizarre and hazardous dietary manipulations. Purposeful dehydration should never be undertaken for this purpose. Distribute the one-page leaflet. *How Do You Shape Up?* (From the Timely Tips series, American Medical Association).	his physical activity. A Common belief is that athletes need extra meat. This has no real basis in fact. Protein needs depend on body size and growth rate. Physical activity increases the need for calories, but not for protein except in the slow and gradual process of muscle development. Many coaches have training rules that dictate strictly what the athletes may and may not eat. These rules may help to insure an adequate diet. "Special" foods may have psychological value even if there is no physiological reason for them.

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KEY VOCABULARY:
Basic Four Food Groups
Culture
Enrichment
Food Habits
Goiter area
Legumes
Minimum Daily Requirements
Orthodox
Recommended Dietary Allowances
Staple food
Tortillas

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III. Nutrition in growth and development: adolescence	Nutrition in growth and development.		
A. Individual variation within the normal growth pattern.	All people follow the same general pattern of growth and development, but there is a wide range of individual variation within the normal growth pattern.		
1. Timing of growth phases	Growth in height and weight occurs in a predictable sequence. The most rapid growth occurs during fetal life -- the time before birth. Rate of growth gradually slows down, although the infant is still growing very rapidly. (In the first year after birth, a baby approximately triples his birth weight!) Rate of growth slows markedly after infancy, and a child grows more or less steadily and slowly until adolescence. Just prior to adolescence many children experience a "chubby" stage as an increase in weight for a time outruns an increase in height. During adolescence about two years of very rapid growth occurs, after which growth in height and weight slows down and eventually ceases.	Figure out how heavy a student in the class would be now if he had kept up the same growth rate he had during the first year of life. If data are available from baby books (they will be for some classes, but not for all), each student can use his own birthweight and weight at the age of one year to figure out his rate of growth, and what he would weigh now if he had kept up the rate. Or use a hypothetical 7-pound baby who weighs 21 pounds on his first birthday. Obtain as many data as possible on students' heights and weights from birth to the present time. Parents, school nurses, and physicians may have data recorded for various periods of students' lives.	For background information on growth and development of children and adolescents, see: - The film *Growth and Development in Children.* By J. M. Tanner, from Association films, Inc. - Tanner, J. M. *Growth at Adolescence.* 2nd Edition, 1962. - Watson, E.H. and G.H. Lowrey. *Growth and Development of Children.* 3rd Edition 1958.

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		Using the information gathered, the class can construct a large graph showing average height and weight from birth to their present age. (Indicate a line on either side of the average, to show range of differences.) Discuss where the chart will go from this age. Then obtain data on heights and weights of a 9th grade class (the school nurse may be able to supply these) to "estimate" the way the chart will finish, up through the 12th grade.	This activity is quite time-consuming; it is included as an extra activity that may be used in a class in which interest in growth is high.
2. Hereditary differences in growth potential	At any given age, there is a wide range of height and weight that may be considered "normal." Individuals vary greatly in how fast they grow, and in their ultimate body size. Potential for growth is fixed by heredity. In order for an individual to achieve his growth potential, he must have all the conditions necessary -- enough of the right kinds of nutrients, rest, exercise, freedom from disease. But the growth potential cannot be changed. Normal growth simply means achieving your	Obtain Meredith growth charts (these are widely used by pediatricians and schools; your school nurse or school physician will probably be able to supply them, and may offer to come to class to explain them. Or use the ones reproduced in the workbook *Food--What For?* from Cooperative Extension.) Each student can plot his height and weight data on a chart. The Meredith chart shows the range of height and weight for 98 percent of normal individuals at a given age. It will be easy	Long-term data kept on a chart such as this are useful in identifying overweight and underweight children as well as in checking progress in growth. The important thing is not where the individual child falls on the chart, but that he stay in approximately the same relationship to the chart as he grows in height and weight. For instance, if a child has been near the middle of the "average" zone in height and weight throughout his childhood, but over a period of a few years his weight

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	own individual growth potential.	to see a student's individual relation to the wide range of normality in height and weight.	moves into the "heavy" or the "light" zone, this might call for medical evaluation.
		Look up dictionary definitions of the terms "normal," "average," and "typical."	It is well to stress at this point the role of heredity in determining the body build and therefore to a large extent height and weight, to provide perspective for the teenager who may be on the far-from-average side.
3. The adolescent growth spurt	The adolescent growth spurt accentuates individual differences. Growth is very rapid during this period, and individuals vary in the age at which they experience the growth spurt.		
a. Sex differences	Most girls experience the adolescent growth spurt about two years earlier than most boys. The average period of most rapid growth for girls is about age 10 1/2 to 13, while for boys it is about age 12 1/2 to 15. In spite of the fact that they experience the growth spurt later, boys grow more in height and weight during adolescence than girls do.	Obtain average height data on boys and girls separately from a class of 7th graders and from a class of 10th graders. Make a chart to compare the changes which occur over this period of time.	7th and 8th graders are at the stage where the girls, on the average, are taller and heavier than the boys. This may be a source of embarrassment and self-consciousness for both sexes. Adolescents need to realize that this state of affairs is both temporary and normal.

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	Thus they end up as adults the larger and taller sex, on the average.		
b. Individual differences	There are individual variations, too, in when teenagers experience the adolescent growth spurt. It is perfectly normal to mature earlier or later than average.		Girls are ahead of boys in physical development from birth. Skeletal development is more advanced in girls than in boys at birth. One may wonder whether this "head start" in development may have some purpose in the ecological scheme of things.
B. Developmental age	Developmental age is not necessarily the same as chronological age. Each person grows and matures according to his own inherited pattern. At any given age, different individuals will be at different stages of development.	Read Part III, "The Growing Individual," in the booklet *The Miracle of Life*. (The American Medical Association.)	
	Developmental age can be measured in several ways. Each component of developmental age tells us something about the changes which take place during growth and development. Some components of developmental age are:	For an illustrated discussion of the components of developmental age see Lesson #3 "Food--for Growth" in the workbook *Food--What For?* (Cooperative Extension.)	
1. Skeletal age	Skeletal age can be assessed by the physician's evaluation of x-ray pictures of certain bones.	Invite the school physician or a local pediatrician to bring some x-ray pictures of developing	

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	Several changes occur in the bones as the person grows and matures. The bones mineralize, or deposit calcium within the protein framework of the bone. This creates dense, hard "ossification centers" which show up opaque on an x-ray. The number and size of ossification centers is an indicator of skeletal development. In addition, the ends of the long bones provide an index to developmental age. In the immature bone, there is a horizontal "gap" near the end of the bone -- actually an area of soft cartilage which will eventually become mineralized and form hard bone. As the bone grows longer, more cartilage is formed. The layer of cartilage is called the "epiphysis" or "growth plate." As the individual matures and the bones achieve their total length, this cartilage layer narrows and eventually disappears, a process known as "epiphyseal fusion" or "epiphyseal closure." The degree of epiphyseal closure can be assessed by x-ray also.	bones and explain them to the class. The process of bone mineralization offers opportunity to discuss why older people's bones break more easily than younger ones; what nutrients are necessary for development of the bone, and where those nutrients are found in foods. (See Appendix II for basic information on functions of nutrients.) Students may be able to procure x-ray pictures of their own bones in cases where a bone has been broken in the last several years. A student who has had such an experience may be able to borrow the x-ray from his physician. Obtain a long bone from an animal (a drumstick bone from a chicken or turkey will do.) Split the bone lengthwise, and examine it closely. Note the spongy area near the end of the hollow center. This is where calcium is laid down as the bone is mineralized, and new cells are formed in the spongy area. Note the epiphysis. Even in a mature bone, a line can be seen.	 Immature Bone Mature Bone

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2. Dental age	Dental age may be assessed by noting the number of temporary and/or permanent teeth which have erupted.		This method of assessing developmental age has value mostly for younger children, since teenagers usually have all their permanent teeth. (Wisdom teeth are so unpredictable as to be useless for this purpose.)
3. Sexual age	Sexual age can be assessed by the physician noting the appearance of secondary sex characteristics.		
4. Morphological age	Morphological age is based on the fact that as the person grows and matures, the proportional size of different parts of the body change. For the newborn, the head is about one-fourth of the total length. While for the adult the head is only about 1/8 the total height. These changes occur because different parts of the body grow at different times. The head and brain do most of their growing during prenatal life and infancy. The reproductive organs grow rapidly during adolescence. The legs also grow a great deal in length		The differential timing of growth in different parts of the body is the cause of much of the awkwardness characteristic of adolescence. A sudden lengthening of legs and arms often results in difficulty adjusting coordination to comply with the new proportions. Similarly, the forehead and upper portions of the face develop before the chin and jaw do. This enables the newborn baby who has practically no chin, to nurse. But it can create a temporarily awkward profile for the adolescent whose chin and jaw haven't yet caught up to the rest of his face.

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	during adolescence. All these changes add up to a change in proportion and shape, as a person grows up.		
C. Nutrition and healthy growth	For a person to achieve his growth potential in good health, it is essential that he be well nourished.		
1. Role of nutrients in building body	Body tissues are made from nutrients. Protein, vitamins, and minerals are all necessary to the building of specific body tissues. Growth increases the need for all these nutrients and for food energy (calories.)	List the major nutrients and relate each to the specific body tissues it helps to build. Read Chapter XIV, "The Teen Years," in *Food Becomes You*, by Ruth Leverton.	
2. Effects of improved nutrition and health on growth in population	People are growing taller at younger ages today than they did in previous generations. There is reason to believe that this is at least in part due to improved nutrition. Studies of Japanese Americans indicate that on the average, first-generation Japanese Americans are taller than their parents who grew up in Japan twenty or more years before. Improved nutrition may be at least partially responsible.	If a museum is available which contains medieval clothing, suits of armor, or other clothing from a far-distant era, compare the size of clothing then with the size of the average person today. Students can determine whether their parents are taller than their grandparents (some will be, some won't.)	Many factors other than nutrition affect stature. The most important is heredity -- including racial influences. Disease and other factors also play a part. The only instances in which nutrition may be assumed to play a major role is in groups where genetic variations are at a minimum -- such as differences in succeeding generations of the same family or racial group.

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		Speculate on some of the factors other than nutrition which may have affected the increased stature of Japanese-Americans.	Young people are maturing sexually at an earlier age than they did several generations ago. In western countries in the last 200 years, the average age of menarche has gone from age 17 to age 12 1/2. The same trend is beginning to show in eastern countries as general health improves.
3. Effects of nutrient inadequacy	Some scientists believe that if a child or young animal is severely malnourished, growth can be affected so severely that the individual will never catch up even if he later is given an adequate diet. It is because of this possible severe effect of malnutrition during rapid growth and because of the high nutritional needs of the rapidly growing child that many nutrition programs in developing countries concentrate on improving the nutrition of the preschool child.		
4. Importance of adequate quantity and quality of protein for growth	To be adequate for growth, a diet must contain sufficient food energy (calories), vitamins, minerals, and good quality protein. Protein or protein and calorie malnutrition are the leading		

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	nutritional disorders leading to poor growth of children in developing nations. In most cases the problem is both in quantity and quality of the protein.		
	Proteins are made up of molecules called amino acids, of which several are essential to humans. A "complete" protein contains all the essential amino acids in approximately the correct ratios to be utilized by the body. Most animal proteins (milk, eggs, meat, fish, poultry) are "complete."		
	"Incomplete" proteins lack one or more essential amino acids, and are characteristic of proteins found in many grains, vegetables, etc. An incomplete protein by itself will not support growth. In most developing countries, most of the protein comes from cereals.		
	The protein value of the diet, then, depends on both the quantity and the quality of the protein. A protein of high quality ("complete" protein) has an amino acid pattern which approximates the requirements of humans	Conduct an animal feeding experiment to show tne necessity of complete proteins for growth.	

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	for the essential amino acids.		
	When two types of food proteins are consumed together, a complementary effect of the two amino acid patterns may result -- giving a better quality protein than either of the two proteins individually. The consumption of beans and rice together, typical of the Puerto Rican dietary pattern, offers a good example. Rice protein has a fairly adequate amino acid pattern -- one of the best of all vegetable proteins -- but the amount of protein in rice is relatively small. It would take a large amount of rice to supply one's protein needs. Beans, however, contain about 3 times the protein as rice. But the protein quality of beans is lower than that of rice, the amino acids methionine and cystine being quite some bit lower than desirable. Eating the two foods together, however, supplies a combination of amino acids which is better than for either food separately. The rice supplies the methionine and cystine lacking in the bean	Use two pairs of weanling (3-week-old) rats. Feed one pair an adequate diet with protein coming from meat and milk. Feed the other pair the same diet except with the protein coming from gelatin powder. (Gelatin is a protein which is poor quality. Gelatin lacks the essential amino acid tryptophan. When gelatin is the sole source of protein, the animals will not grow.) Students should be responsible for caring for, feeding, weighing, and observing the rats. Growth differences should be obvious in 3 to 4 weeks. Rehabilitate the rats fed gelatin by feeding them the other diet. If time permits, keep both pairs of rats on the adequtae diet for a number of weeks, continuing to weigh them at intervals. Observe whether the rats fed the gelatin diet ever catch up to the others. (It's possible that they may, since the rat's most rapid	The booklet *Animal Feeding Demonstrations for the Classroom* (Dairy Council) gives instructions for procuring animals, caring for them, and on specific diets. See page 14 for a specific diet to carry out the experiment suggested here.

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	protein, and the beans have a liberal supply of lysine (which is in lowest supply in rice).	growth period, and hence greatest nutritional vulnerability, is prior to weaning.)	
	The same kind of complementary effect occurs when you pour milk over cereal or eat cheese with bread. The incomplete pattern of essential amino acids in the cereal protein is complemented by the amino acids in the milk products -- producing more food value than had the cereal been eaten at another time than the milk, or the bread separately from the cheese.	Use the opportunity provided by the animal feeding experiment to discuss the nutritional value of gelatin. Gelatin is often promoted as a "health" kind of food -- specifically good for strengthening fingernails. Actually, because of its poor protein quality, gelatin cannot be used by the body unless it is fed with a liberal supplement of complementary protein. Gelatin powder in a glass of fruit juice contributes nothing more than calories and the vitamins present in the fruit juice.	

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KEY VOCABULARY:

Adolescent growth spurt	Fetal
Amino acids	Heredity
Average	Incomplete protein
Calcification	Morphological
Chronological	Normal
Complementary protein	Ossification center
Complete protein	Potential
Developmental	Proportion
Epiphysis	Skeletal

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IV. Achieving and Maintaining the Best Weight is a Concern for Many Individuals			
A. Factors which affect body weight	Food intake, exercise, and heredity all affect body weight.		
1. Food intake	We all know that the food we eat is related to how fat or thin we are. But the picture is much more complicated. - The body needs food energy for activity, for growth, and for maintenance. This "maintenance" category accounts for the largest percentage of calories -- it can be measured as Basal Metabolic Rate (BMR) and varies rather widely among individuals. BMR includes the energy needed to keep the body temperature constant, and to keep internal organs such as the heart, liver, kidneys, etc. working. - The source of energy for the body is food. Food is composed of proteins, fats, and carbohydrates, which are metabolized in the body to yield calories. Weight for weight, fat yields over twice the number of calories that protein or carbohydrate provide. So foods with a high	Discuss: What is a calorie? Find out the technical definition of a calorie. Look up the term "calorimeter" in an encyclopedia to find out the method used by scientists to measure the amount of calories contained in a food. Read the leaflet *Calorie Sense and Nonsense* (Cooperative Extension, Cornell University).	A Calorie (Kilocalorie) is the amount of heat energy required to raise the temperature of one kilogram of water one degree Celsius. Technically this unit is written with a capital letter - Calorie. In popular literature the lower case (calorie) is most often used. For background, see "Overweight and What it Takes To Stay Trim," chapter in the *Yearbook of Agriculture 1969: Food For Us All.*

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	fat content are the concentrated sources of calories in our diets. - There is great variation in individual caloric needs, Calorie needs are affected by age, body size, sex, BMR, rate of growth, and physical activity.	Each student can keep track of what he eats for a 24-hour period. Keep track of amounts as well as kinds of food. Then using a table of caloric values (several are listed under "Teaching Aids") calculate his approximate calorie intake. Compare the caloric intakes of all the students in the class. Note the high and the low intakes. Average the girls' intakes separately from the boys' Which were larger on the average? Why? Relate students' individual caloric needs to their circumstances of size, growth rate, physical activity.	
2. Exercise	Exercise makes a difference in body weight. Even though it does take a good deal of exercise to use up the caloric equivalent of what may seem to be a small amount of food, exercise can make a difference. The best kind	Students can keep track of how they spend their time for one 24-hour period. Classify activity as sleep, resting, light activity, moderate activity, strenuous activity. Then figure out how many hours were spent in each category, and what percentage of the day.	Studies show that many teenagers, like adults, lead sedentary lives. They are not likely to be aware of this, because many teenagers are so busy they feel as if they are on the go all the time. But time actually spent in physical exercise is usually small. Not only

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	of exercise is the kind that you do every day -- the kind that becomes a habit. Then the few extra calories used become significant. A habit of walking, instead of driving, or playing in a sport instead of being a spectator, can make a real contribution in keeping the pounds off.	*Sleep* *Resting:* lying awake. watching television, sitting in class, reading *Light activity:* typing, eating, dressing, driving, writing *Moderate activity:* housework, walking, washing the car *Strenuous activity:* running, swimming, climbing stairs, and strenuous sports such as soccer, basketball, riding a bicycle.	does this make weight loss more difficult for the overweight youngster, but habitual sedentary living establishes a pattern which will carry over into adult life, with possible ill effects. There is no doubt that increased physical exercise would be of benefit to most people in the U.S., both in terms of weight control and in relation to heart disease.
3. Heredity	Body weight can be affected by food intake and by exercise, but heredity determines body build and thus has the largest influence on body weight. Bony structure, muscle configuration, and fat distribution are all part of basic body build, which is fixed by heredity. Bone structure cannot be changed; muscle development can be changed only within narrow limits; total body fat can be changed, but its distribution usually can't be altered. Some people are tall and lean, others heavy and large-boned, others soft and round. These variations are normal.	Have students prepare anonymous chart cards of their weight, their sitting height, the length of their arms, the circumference of shoulders and hips. The cards can then be sorted on the basis of a single common characteristic and the other characteristics compared and graphed.	Age ____ Sex _____ Weight ____ Height _____ Sitting Height _____ Length of arm _____ Length of leg _____

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	Heredity also determines the proportions of the body. For instance, two people the same height may look quite different because one has long legs and a short trunk, while the other has short legs and a long trunk.		
	Understanding the role of body build in the determination of body weight is important because otherwise goals for body weight may be unrealistic. It is not at all realistic for a heavy-boned individual to diet to become a wispy, elf-like creature, because it will just never happen.		Studies have shown that many teenage girls feel they are too fat: they diet to lose weight when they are not really in need of reduction. A heavy skeleton may make the scales read high for an individual; and for her, dieting will never achieve the Twiggy look. One of the most important aspects of teenage weight control is helping the adolescent to accept himself and to set realistic goals.
B. Weight vs. fatness			
1. Individual difference	If people vary in their inherited bony and muscle structure, it stands to reason that not everyone who is the same height will be the same weight. And individuals who are the same height and weight will not all be the same degree of fatness or leaness. A person with a heavy skeleton will not be as fat as a	Show selected slides from the slide series *Changing Attitudes Toward Weight Control* (Cooperative Extension.) The slides illustrate some of our attitudes toward the heavy person and toward controlling weight.	It has not really been established whether the health hazard from obesity is from overweight or overfatness. Probably both contribute to the risk.

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	person of the same height and weight who is light-boned.		An excellent sourcebook for professionals providing an overview of all phases of obesity is the U.S. Public Health Service Handbook *Obesity and Health.*
2. "Overweight" or "underweight"	We can change fatness by changing our eating and exercise patterns. We can't change body build. Some people may always be "overweight" or "underweight" by the charts because of their bone structure, even if they are not too fat or too thin.		Other sources of background information: Obesity - Monograph from the Nutrition Foundation, Inc. Weight Control Source Book (National Dairy Council)
3. Measurement	We usually measure weight rather than fatness. All the tables are based on weight. This is because there haven't been any very good measurements for fatness. There are some ways of measuring fatness that are now in use in research settings; but as yet we don't see them in the physician's office. Probably someday we will.		At all ages, girls have a larger proportion of their bodies as fat than do boys. Also, as the adult grows older, active lean tissue is gradually replaced by fatty tissue even if weight remains constant.
C. Evaluation of weight status	How do you determine what you should weigh?		
1. Limitations of height-weight tables	Tables of heights and weights aren't very good standards for teenagers. They have their limitations	Obtain some of the height-weight tables in use currently for adults, and study them. Especially try	

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	even for adults, but for youngsters who are still growing they don't give a true picture at all.	to analyze them for their limitations. (For instance, those from insurance companies are based on only insured individuals; methods of taking measurements vary; in some tables different categories are given for light, medium, and heavy frames, but no way is given to determine which you have.)	
2. Physician's judgment	The best way to tell whether you are too fat or too thin is to visit your physician and ask for his evaluation. He will take into account your growth record, your general health, how you look and feel. His judgment on this score is the soundest you can get.	Read the booklets *A Girl and Her Figure*, and *A Boy and His Physique*. (National Dairy Council.)	
3. Optimum weight	Nobody wants to be "fat" or "skinny" - or to feel that way. The best weight for an individual is probably the weight at which he feels his best and looks his best -- regardless of what the tables say.		
D. Health implications of obesity			
1. Morbidity/ mortality	It is well known that, in the adult, obesity is associated with increased risk from several diseases (including cardiovascular disease) with a lower life expectancy than the person of normal weight.	Show the film *Obesity* from Encyclopedia Brittanica.	

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2. Social/ emotional	At any age, obesity is a social and emotional handicap.		
3. Obesity: transient or persistent	For adolescents, it is important to distinguish between "transient obesity" and the long-standing, more serious type. It is very common for adolescents to experience a time of relative chubbiness just prior to the adolescent growth spurt. Once the growth spurt begins, the excess fat disappears, usually in a few months. But for the person who has been fat, since childhood, the adolescent growth spurt probably won't cure the condition. This type of "always been fat" obesity is serious because it is the hardest kind to combat. For this kind of individual, it is well to get weight under control as early as possible -- certainly during the teenage years.	Show the film or videotaped program "Food--for Your Figure" from the series *Food--What For?* (Cooperative Extension.) Shows the problems and solutions for a moderately chubby teenager and for some younger children who are frankly obese.	Overweight teenagers are apt to be extremely sensitive about their size. Their embarrassment may be expressed in many ways. It is important that the classroom situation not reinforce the feeling of being different for the obese youngster. Studies have shown that obese teenagers often develop personality traits characteristic of other minority groups in society -- they really feel persecuted. The obese teenager needs help with weight, but very often he needs even more help in accepting himself as a person. For more insight into the problems of the obese adolescent, read Chapter 9, "Obesity in Adolescence" in the book *Overweight: Causes, Costs and Control*, by Jean Mayer. Also see the article "Adolescent Obesity" (Spargo, Peckos, & Heald) in the Dec. 1966 issue of NUTRITION TODAY.

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E. Dealing with overweight	What to do and not to do about overweight.	Read the Leaflet *The Healthy Way to Weigh Less (AMA)*	
1. Medical supervision	See your doctor if you think you have a weight problem. First, he can help assess whether you do have a problem and just how big a problem it is. Second, he can help you make a plan of action taking into account your own individual circumstances.	Read the paperback book *Slimming for Teenagers*, by Lester David. This book is excellent, and is geared directly to the adolescent. It's a good investment for any teenager who has -- or thinks he has -- a weight problem.	
2. Vulnerability to fad diets	Don't fall prey to fad diets or gimmicks. There is no easy or magic way to lose weight. There is no particular food or combinations of foods that will make you lose weight. The only way to slim down is to decrease total food intake and to increase total exercise.	Take one of the more well known fad diets, or, even better, the popular diet going around school at the moment, and analyze it for nutritional adequacy. It should meet the recommendations of the Basic Four Food Groups for teenagers to be considered nutritionally adequate.	
	Teenagers are growing rapidly, and their nutritional needs are high -- even for the obese. Most fad diets are not adequate nutritionally. They can seriously short-change you on proteins, vitamins, and minerals - and may endanger your health.	Discuss the reasons why fad diets are popular and the reasons why they often fail.	Fad diets seem to offer a simple, easy way to weight loss. Actually they seldom succeed because usually they so restrict food that it is impossible to stay on them very long. Any diet which limits foods to a few will not be adhered to over a period of time -- and is not likely to be nutritionally adequate.

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	There is a booming business in useless reducing aids, ranging from candy to pills. There are many who take advantage of the desire of the fat person to lose weight. Often these items are a waste of money -- sometimes terribly dangerous.	Read the article "Scandal of the Diet Pills," LIFE Magazine, January 26, 1968, pages 22-29. Discuss the reasons why people fall prey to health quacks in trying to reduce.	Teenagers are often susceptible to fad diets, gimmicks, etc. because of the crowd's influence -- it's the "thing to do." Sometimes this is true even for the girl who doesn't need to lose weight. A sound background of knowledge is the most effective means of combatting this vulnerability. Help students to analyze and see for themselves the fallacies in some of the "simple" ways out of the weight problem.
3. Evaluating and modifying eating and exercise habits	Evaluate your own eating and exercise habits. The records you kept earlier on your food intake and your activity will help. Are you the kind of person who nibbles constantly? Or do you gorge on the evening meal -- or the bedtime snack? Is there room for improvement in your daily routine to allow for more physical activity? Base your plan of action on an honest appraisal of your own strong points and weak ones. Make your plan one you can live with!	Distribute the one-page leaflet "Operation Diet Right" (Timely Tips Series, American Medical Association.)	If there are several obese children in a school or a school system, it may be possible for an interested teacher or school nurse to initiate the formation of a program to help these youngsters. Group efforts often succeed best for teenagers, since the support of others is very important. Such a program should involve the school physician, school nurse, health, physical education, and home economics teachers, parents, and ideally other professionals from the community. It should focus on helping the youngsters reform their eating and exercise habits to achieve and maintain weight loss. It is well

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			established that obesity which begins in childhood is the toughest to combat for the adult. The earlier a program of control is begun the better. Sometimes a school situation with the support of peers and sympathetic adults can be the impetus the obese youngster needs. One recent study showed an expressed desire for a separate class on weight control (in lieu of a study hall) for those who need and want it.

KEY VOCABULARY:
Basic Metabolic Rate
Body Build
Calorie
Calorimeter
Cardiovascular disease
Fad
Obesity
Overfatness
Overweight
Transient

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V. Environmental factors which affect nutritional health	Environmental factors affect nutritional health by influencing what foods are available, the quality of those foods, and what foods the individual chooses to eat.		
A. Technology	Technology affects the foods available to people, and the nutritional quality of those foods.		
1. Agricultural processing, and marketing developments	Modern developments in agriculture, food processing, transportation, and food marketing make it possible for us to have a great variety of foods available year around. Foods which formerly were limited to one geographic area or one season of the year are now in the stores all over the country and all year around.	Show the film *Food the Color of Life*. (National Dairy Council.) Presents the story of food, including the effects of agricultural and industrial technology. From a day's food intake, figure out how many food items would have to be eliminated if we had to depend only on locally produced, seasonal foods. Invite a local food retailer to discuss the procedures involved in marketing fresh produce. He can point out the diversity of sources and the supply and price of various items.	

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2. Institutional feeding	Institutional feeding makes nutritious food available to people in schools, hospitals, prisons, and other institutions.	Discuss the effect of school lunch on the day's food intake. If your school has a school lunch program, find out what the participation is. Find out what alternatives are available for eating lunch, and discuss whether the alternatives tend to provide as adequate a lunch as the school lunch program. If participation in school lunch is relatively low, the class can undertake to find out why and to recommend measures to be taken to increase participation.	Requirements for the Type A School Lunch may be found in Appendix II. For background on the School Lunch program, see the booklet, *Health Aspects of the School Lunch Program* (American Medical Association.)
3. Food availability	Our food habits change as the food available changes.	Discuss the effect of vending machines on American food habits. The class can take a survey of the places in the community where vending machines exist. The survey should note the type of vending machines and the people served. From this information the class may be able to draw some tentative conclusions about possible effects of the vending machines on nutrition. In the specific instances	

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		found, do the vending machines tend to provide nutritious food where it would not otherwise be available? Or do they tend to make foods easily available which contribute nothing but calories, while their quick service may entice people to use them instead of an alternative source of food? Students who have lived in a foreign country or in another part of the U.S. can probably think of changes in their family's food habits which occurred as a result of moving where different foods were available.	
B. Income	Income affects the individual's food supply. In a cash economy where few people grow all their own food, a certain minimum amount of money is necessary in order to be adequately nourished. What the minimum is will depend on the individual's needs and on his skill in managing his resources.	Give the class several different hypothetical sums of money, on which to plan a day's food for themselves. The sums of money should range from liberal to very limited. Compare different students' solutions to the problem. Determine whether nutritionally adequate diets were more difficult to plan on the very limited money. Also notice whether any	

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		particularly better choices were made when plenty of money was available.	
C. Government action	Government regulations affect the quality of foods available.		
1. Control of nutritional quality	The nutritional quality of some food is regulated by law.	Students can check labels of products such as grits, spaghetti, macaroni, and rice that are used in their home to see whether they are enriched.	Enrichment laws were made on the basis of the belief that almost everybody ate a significant amount of bread each day. Today it is obvious that some groups depend more on pasta, rice, or some other grain foods than they do on bread. Also, Americans are eating increasing amounts of sweet baked goods every year.
a. Enrichment	Enrichment of white bread and flour is mandatory in most states. During the milling process used in making white flour, much of the iron and B vitamins which are contained in the whole grain are lost. Enrichment restores these nutrients.	Discuss: Do you think it should be mandatory to enrich all flour and grain products?	In Puerto Rico, the law requires that rice be enriched. Puerto Rican families who move to New York State must learn to look at the label and buy enriched rice if they are not to lose the nutritional benefits of enrichment.
b. Fortification	Fortification of some foods helps supply nutrients that would otherwise be difficult to obtain. Fortification		

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	differs from enrichment in that fortification means adding a nutrient that was not originally present in the food or that was not present in the amounts added. Examples of fortified foods are vitamin D milk, iodized salt, and vitamin A fortified margarine. When a food is chosen as a vehicle for fortification, it is chosen because of its potential for getting the nutrient to the people who need it. For instance, salt is an appropriate vehicle for iodine because everybody needs iodine and the amount needed is very small. Almost everyone uses some salt. In the case of vitamin D, children have the greatest need. Vitamin D's function is in the absorption of calcium so milk is the vehicle of choice, since it reaches children and it puts vitamin D in the same product as the calcium.	The consumer has the choice of buying iodized or plain salt. Hold a debate on this subject: Resolved that all salt be required by law to be iodized. (This may take a little researching -- students can find out whether iodized salt costs more than plain salt in their area, whether their families understand the value of iodized salt and therefore choose it, how people feel about the two products.)	
c. Standards	For both enrichment and fortification, standards are established setting minimum and maximum limits for the nutrients to be added. This	Check to see whether the salt served in the school cafeteria is iodized.	

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	avoids the possibility of consuming too much of a nutrient.	Collect labels from ready-to-eat breakfast cereals, and compare their content of iron and B vitamins. Discuss: Should there be a regulation which restricts more closely the limits of fortification of breakfast cereals?	
d. Abuse of enrichment "halo" in some advertising	While enrichment and fortification have proven their value in improving the nutritional health of people, some products take advantage of the "halo" to advertise their products as extra, super-fortified. The classic example here is breakfast cereals and while a little extra iron and B vitamins do no harm, the claims made for these products exaggerate their significance.		
2. Control of sanitary quality	Government agencies are responsible for controlling the sanitary quality of the foods we buy.		
a. Federal Food and Drug Administration	The Federal Food and Drug Administration has jurisdiction over foods which move in interstate commerce. It can and does seize foods which are contaminated or adulterated and remove them from the market.	Trace the history of the Food and Drug Administration, beginning with the passage of the Pure Food and Drug Law enacted in 1938. Information may be found in encyclopedias or in the article "The Food	

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		and Drug Administration," page 290 in The Yearbook of Agriculture 1966: *Protecting Our Food*. This Agriculture Yearbook also contains numerous other articles relative to food protection.	
b. State agencies	State agencies (In New York the Department of Agriculture and Markets) are responsible for regulating the sanitary quality of foods sold within the state. Strict regulations are established for perishable foods.		
c. Local inspection of eating establishments	Even restaurants and other public eating places are subject to inspection for sanitary facilities and food handling. Local health departments employ sanitarians, who have among their responsibilities the inspection and reporting of such establishments.	Invite a sanitarian from your city or county health department to come and speak to the class about the regulations which govern the cleanliness of public eating places and the health and practices of food handlers.	
D. Advertising and propaganda	Advertising and propaganda affect our food choices.		
1. Advertisements for food products	Advertisements for food products make up a large part of the advertising on television, radio, and in newspapers and magazines.	Students can collect food advertisements from newspapers and magazines and those they see on television for a few days.	

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		Use the ads as the basis for a discussion including the following points: - How many of the advertised products had the students eaten in the last week? Do they think the advertisements influenced them -- or their mothers -- to purchase the products? - To what underlying motives do the ads appeal? (They may be focused on youth, sex appeal, home and comfort, adventure, nutritional health, or other motives.) Which approaches do the students think are most effective in getting people to buy the products? - If a tape recorder is available, students can tape "jingles" from food commercials on television (Saturday morning is a good time.) The jingles can be played back in class and discussed.	
2. Propaganda of the food faddist	The propaganda of the food faddist and the nutritional quack persuades many people to spend money on worthless food supplements and/or to jeopardize their health by following highly restricted diets.		

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	. The quack, according to dictionary definition, is the one who "boasts to have a knowledge of wonderful remedies; an imposter in medicine." Nutritional quackery is the most widespread and expensive kind of health quackery in the United States today. Literally millions of dollars are spent for products worthless for the purpose for which they are sold. These products account for more than a few tragic consequences - even deaths.	For a fascinating historical account of nutritional quackery and food faddism in the United States, read the paperback book *The Nuts Among the Berries* by Ronald M. Deutsch.	See the article "Food Fads and Frauds," by F. J. Stare, in *Today's Health* (March 1969.) p. 88 (from the American Medical Association.)
	. There are varying degrees of food faddism and quackery. --At one end of the spectrum are the relatively innocuous beliefs that some people have that specific foods will give them a "tonic" or be good for their various ailments. Many people waste money on health foods or vitamin preparations which do them no more good than everyday foods. At the other extreme are the "treatments," "cures," and phony dietary regimes which can lead a person to severe malnutrition and even death. Belief in faddist "cures" can lead a person to postpone legitimate medical treatment of a	Read Chapter 9, "Our Shifting Nutritional Problems," in *Health: A Quality of Life*, by John S. Sinacore. Read the booklet *Food Facts Talk Back* (American Dietetic Association). It gives answers to specific questions on food fads and myths. Read Part II (Chapters 13-17) of the book *The Medicine Show*, by the Editors of Consumer Reports.	

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	serious disease until the disease has progressed too far to be arrested. . People who are ill or elderly are vulnerable to the claims of the faddist or the quack because he offers an easy solution to what may be a very serious and upsetting problem. They may avoid or postpone much needed medical attention while relying on the worthless treatment of the faddist's regime. People who are not sick are vulnerable too. Many health foods, tonics, and supplements, offer the hope of a "lift," a release from fatigue, a renewed youthfulness and vitality. These claims are very attractive to many people. But "health foods" contain nothing not available from ordinary foods much more cheaply, and a person who eats a balanced diet does not usually need supplements. . The whole area of weight reduction is fraught with faddism and quackery. Diets which are claimed to "take off pounds without hunger," or candies, special foods or pills to help reduce are usually useless and may be	Show the film *the Health Fraud Racket*. (U.S. Public Health Service.) Read the following materials (leaflets and booklets) from the American Medical Association: *Merchants of Menace* *Facts on Quacks* *Health Quackery* Review the article in the January 1968 issue of LIFE Magazine, "The Scandal of the Diet Pills." Read "Fat Fantasies" in *Health News*, April 1968. (NYS Dept. of Health.)	

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	dangerous. Reducing should always be done under medical supervision, and there is no magic or easy way to do it. . The typical approach of the quack may include the following kinds of claims: . A special or "secret" food, formula, diet, or device that can cure disease. . A quick, easy cure or "lift." . Case histories attesting to the value of his product. . Claims his method is better than a physician's, perhaps because it is new, unknown, or secret. . Subclinical deficiencies dragging you down -- hidden illnesses his product can cure. . Overprocessing and depleted soil are robbing foods of their nutritional value -- "natural" foods or "organic" foods must be eaten. . Nutritional quackery cheats people. At its worst, it can be very dangerous. Several agencies and organizations attempt to curtail the activities of nutritional quacks. These include the American Medical Association, the Better Business Bureau, the Food and Drug Administration, and State and Local health departments.	Show the film *Nutrition Sense and Nonsense*. (Cooperative Extension.) Obtain the booklet *Nutrition Books: A Guide to their Reliability*. (Cooperative Extension.) Using this guide, select some of the nutrition books cited in the last portion-the books which are not accurate and reliable -- and read them. Analyze them for their appeals to people and for the fallacies in their arguments. Distribute the one-page leaflet *Beware of Food Quackery* (from the Timely Tips Series, American Medical Association.)	Under the protection of the First Amendment, a person may write anything he chooses and sell it in a book. Thus there is no legal grounds for action against many writers of faddist nutrition books. If, however, the publication is sold with and used to promote a product which is fraudulent, it can be seized. For example, the best-selling book *Calories Don't Count* was seized and the author prosecuted only when the book was sold with a product - in this case safflower oil capsules, useless for the purpose for which they were promoted.

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E. Political factors	Political factors can affect the nutritional health of people.		
1. War	War almost always interferes with the food available to people. Routes of trade are cut off, farms and warehouses are often destroyed, farmers are often obliged to go into military service.	Gather information and discuss the effect of a current political conflict on the nutritional health of the people involved.	Additional Resource: Film, *World of Plenty 1942-43.* Depicts the production, distribution, and consumption of food in three parts: the first dealing with pre-World War II problems of overproduction; second with controls, enrichment and fortification exercised during the war; third with plans for the postwar era to control food production and distribution in accordance with world needs. British. Available from Film Library, N.Y.S. Department of Health, 84 Holland Avenue, Albany, New York.
2. Budget policies	On a less drastic level, politics are often involved in decisions to enrich or fortify a food product, to import or export, to devote money to agricultural and nutritional research. These political influences operate on all levels -- national, state, and local.	Review the history of food rationing and "victory gardens" in the United States during World War II. These represented attempts by a government to insure nutritional adequacy in the face of possible shortages. Discuss the current interest in the United States Congress in hunger and malnutrition among poor people in the U.S. Do you think that the concern now being expressed will result in benefits for the people who are malnourished?	
		Find out what the local situation is with regard to fluoridation of water. If your community's water supply is fluoridated, find	A local dentist or representative of the dental association will be a good resource person.

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		out how recently the practice was begun and, if you can, events leading up to the decision to add fluoride to the water. If your community does not have fluoridated water, find out whether it has been a political issue recently and the history of the issue in your community. Analyze the arguments for and against fluoridation. Do the arguments against have a tinge of the food faddist? Discuss: In the U.S. we are rather inconsistent in our methods for adding nutrients to foods, even when their addition has been proven beneficial. Most states make enrichment of bread mandatory. Salt is sold both iodized and plain, and the consumer must choose what to buy. When it comes to fluoride in water, it is usually voted upon by a community. Should legal mandate or consumer choice be the basis for such decisions? Which method do you think is best? Why?	
- -			
KEY VOCABULARY: Availability Enrichment Environment Fluoridation Food Faddism Fortification Institutional Propaganda Quackery Sanitation Technology			

APPENDIX I

TABLE OF MAJOR NUTRIENTS, THEIR PRINCIPAL FUNCTIONS, BEST FOOD SOURCES, AND DEFICIENCY DISEASES RELATED TO THEIR LACK.

NUTRIENT	PRINCIPAL FUNCTIONS	BEST SOURCES	DEFICIENCY DISEASE
Calories	Providing energy.	All foods.	Marasmus (thinness, wasting of tissue): starvation if severe enough.
Protein	Building of all body cells and tissues.	Meat, fish, poultry, beans, nuts (including peanut butter), milk, cheese, eggs. Cereals contain some protein which is important in many parts of the world; cereal protein is less important in the U.S. because animal protein foods are available.	Growth retardation, if protein deficiency is severe and calorie intake is more adequate. Kwashiorkor may develop in children. Kwashiorkor is characterized by muscle wasting, retention of fluids, weakness, pot belly, hair changes, skin changes. If not corrected the condition is fatal. The child is also more susceptible than normal children to the effects of infections, and may die from a bout with measles, diarrhea, or other infection.
Minerals			
Iron	Producing hemoglobin, the substance in red blood cells which carries oxygen to the tissue of the body.	Meat, eggs, whole-grain and enriched cereals and breads, beans, dried fruits such as raisins and prunes.	Anemia (too few red blood cells or red blood cells which contain too little hemoglobin.)
Calcium	Building of bones and teeth. Very small amounts of calcium are needed for the clotting of blood and the functioning of the muscle and nervous sytems.	Milk and foods made from milk (cheese, ice cream.)	We don't yet know very much about the effects of calcium deficiencies, since humans can apparently adapt to intakes over a fairly wide range. There is evidence, however, that low calcium intakes throughout life may contribute to the development of osteoporosis, which

NUTRIENT	PRINCIPAL FUNCTIONS	BEST SOURCES	DEFICIENCY DISEASE
			is a disease of the bone and afflicts many elderly people.
Iodine	Proper function of the thyroid gland.	Iodized salt (we get some iodine from foods but in New York State the soil does not contain enough iodine to rely on food sources without using iodized salt.)	Goiter (enlargement of the thyroid gland.)
Fluoride	Resistance to dental cavities; may play a role in the formation of bone.	Fluoridated water, in areas where the water does not contain an adequate amount of fluoride naturally. In communities where the water is not fluoridated and does not contain natural fluoride, some protection for teeth may be obtained by application of fluoride solution to the teeth by the dentist.	Increased susceptibility to dental caries.
Vitamins			
Vitamin A	General growth, healthy skin and eyes.	Yellow, orange, and dark green leafy vegetables- Also animal fats -- liver, whole milk, butter, vitamin A fortified margarine.	Extreme deficiency causes skin changes, night blindness, thickening of the cornea, and eventual blindness.
B Vitamins			
Thiamine	Utilizing other nutrients. Energy metabolism.	Whole grain and enriched breads and cereals; pork.	Beri beri (numbness in the limbs, gastro-intestinal disturbances; muscle degeneration; cardiac disturbance.)

NUTRIENT	PRINCIPAL FUNCTIONS	BEST SOURCES	DEFICIENCY DISEASE
Riboflavin	Utilizing other nutrients	Whole grain and enriched breads and cereals, milk	No well defined clinical deficiency syndrome; Cheilosis (cracking at corners of mouth) is typical.
Niacin	Utilizing other nutrients	Whole grain and enriched breads and cereals. The amino acid tryptophan, present in protein, is partially converted to niacin in the body.	Pellagra (Diarrhea, skin lesions, mental derangement if severe.)
Vitamin C (Ascorbic Acid)	Building collagen (the cementing substance that holds the cells of the body together)- a necessary constituent of many enzyme systems	Citrus fruits, tomatoes, cabbage, strawberries, melon, green pepper. Potatoes are a fair source.	Scurvy (Sore, bleeding gums; small hemorrhage under the skin; tenderness in joints and limbs; loss of appetite)
Vitamin D	Necessary for the utilization of calcium	Vitamin D fortified milk. The skin makes vitamin D in the presence of sunlight.	Rickets (Deformities in bones due to lack of calcification. Includes bowed legs, enlarged wrists and ankles, enlargement or "beading" of ribs, "pigeon" chest)

APPENDIX II

Summary of School Lunch Standards*

In order to qualify for federal school lunch funds by participation in the National School Lunch Program, a school must serve meals meeting established nutritional requirements. To qualify as a "Type A Lunch," a lunch must include:

1. 8 ounces of fluid whole milk
2. A protein-rich food: 2 oz. of cooked or canned lean meat, fish or poultry; or 2 oz. of cheese, or 1 egg, or 1/2 cup cooked dried beans or peas; or 4 tablespoons of peanut butter; or an equivalent combination of these foods.
3. Vegetables and fruits: two or more to equal 3/4 cup total. Undiluted juice can be used as the equivalent of 1/4 cup of the total. The inclusion of an ascorbic acid source daily and vitamin A food on alternate days is recommended.
4. Bread or a bread substitute: either whole grain or enriched, one slice or its equivalent.
5. Butter or fortified margarine: 2 teaspoons used as a spread or in preparation of other foods.

If schools participate in the National School Lunch Program, they must provide lunches free or at reduced prices for needy children. U.S. Department of Agriculture regulations issued in October 1968 require that local school authorities develop and publicly announce their policy for determining which children are eligible to receive free or reduced price meals. The food service programs must be operated in such a way that children receiving free or reduced-price meals cannot be identified or singled out in any way.

*As of the fall of 1969, the requirements have been amended to specify only one teaspoon of butter or margarine rather than two teaspoons. In addition, special attention should be given to foods which supply iron, vitamin A, and calories. It is desirable that a food rich in vitamin A be served every day and that foods rich in iron be served daily.

MULTIMEDIA RESOURCES

LEAFLETS AND BOOKLETS

From the National Dairy Council (contact your regional office.)

A boy and his physique. 36 pp. 20¢.
A girl and her figure. 40 pp. 20¢.
A girl and her figure and you. 16 pp. (Workbook companion piece to A Girl and Her Figure.) 15¢.
They ask why. 16 pp. 15¢.
Your food -- chance or choice? 12 pp. 7¢.

From the American Medical Association, 535 North Dearborn Street, Chicago, Illinois 60610.

Can food make the difference? 6 pp. 15¢.
Facts on quacks. 32 pp. 15¢.
Health quackery. 16 pp. 20¢.
The healthy way to weigh less. 8 pp. 10¢.
The merchants of menace. 8 pp. 10¢.
The miracle of life. 24 pp. 40¢.
The wonderful human machine. 56 pp. 45¢.
Timely Tips Series. One-page, approximately 3" x 6" leaflets. 20¢ per 100.
- *Beware of food quackery*
- *Aid for acne*
- *Operation diet right*
- *Let breakfast fight your battles*
- *How do you shape up?*

Vitamin supplements and their correct use. 8 pp. 15¢.
Your age and your diet. 8 pp. 15¢.

From Cooperative Extension, Cornell University. (Contact the Cooperative Extension Home Economist in your county.)

Calorie sense and nonsense. 8 pp. Single copies free, additional copies 5¢.
Food value wheel. 8 pp. Single copies free, additional copies 10¢.
Food--what for? 36-page workbook. $1.00.
Nutrition books -- a guide to their reliability. 23 pp. Single copies free, additional copies 15¢.

From other sources:

Public Affairs Pamphlet No. 299. *Personality "plus" through diet -- foodlore for teenagers.* Public Affairs Pamphlets, 22 E. 38th Street, New York, New York. Single copies 25¢. 10 to 99 copies 20¢ ea.

The Nutrition Foundation. *Food choices -- the teenage girl.* The Nutrition Foundation, Inc. 99 Park Avenue, New York, New York, 10016.

The American Dietetics Association. *Food facts talk back.* The American Dietetic Association, 620 North Michigan Avenue, Chicago, Illinois, 60611.

UNESCO. *The puzzle of food and people* (by Annabel Williams-Ellis) Published for UNESCO by Manhattan Publishing Company, 225 LaFayette Street, New York, New York, 10012.

New York State Department of Health, 84 Holland Avenue, Albany, N.Y. 12224.
Vitamin A in fruits and vegetables.
Vitamin C in fruits and vegetables.

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Deutsch, R.M. *The nuts among the berries.* Ballantine Books, Inc. 101 Fifth Avenue, New York, N.Y. 10003.

Editors of Consumer Reports. *The medicine show.* rev. ed. 1963. Consumers Union, Mt. Vernon, N.Y.

Leverton, R.M. *Food becomes you.* Dolphin Books, Doubleday & Co., Inc. Garden City, New York. 1961. pa.

Sebrell, W.H., Haggerty, J.J. & Editors of LIFE. *Food and nutrition.* (from the LIFE Science Library.) Time, Inc., New York. 1967.

The Yearbook of agriculture 1966: protecting our food. U.S. Government Printing Office, Washington, D.C. 20402. $2.50.

Wilson, Fisher, & Fuqua. *Principles of nutrition.* John Wiley and Sons, Inc., New York, N.Y. 2d ed. 1963.

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Maloy, Lorraine. *Fat fantasies.* Health News. April 1968. p. 2. New York State Department of Health, 84 Holland Avenue, Albany, New York 12208.

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Sinacore, J.S. *Our shifting nutritional problems.* Health: A Quality of Life. Chapter 9. MacMillan Co., New York, N.Y. 1968.

Storwick, C.A. & Fincke, M.L. *Adolescents and young adults.* The Yearbook of Agriculture 1959: Food. pp. 303-310. U.S. Government Printing Office, Washington, D.C. $2.25.

The scandal of the diet pills. LIFE Magazine. January 26, 1968. pp. 22-29.

FILMS

Food--for health. Food-for growth. Food--for your figure. From the series Food--What For? each 28 min., black and white film or videotape. Cooperative Extension. Contact the Extension Home Economist in your county.

Food the color of life. 22 min., color. National Dairy Council (Association Films, 600 Grand Avenue, Ridgefield, New Jersey 07657.)

Nutrition sense and nonsense. 22 min. color. Cooperative Extension. (Contact the Extension Home Economist in your county or write to Film Library, Roberts Hall, Cornell University, Ithaca, N.Y. 14850.)

Obesity. 12 min. color. Encyclopaedia Brittanica Films. ($2.50 loan from Film Library, Roberts Hall, Cornell University, Ithaca, N.Y. 14850.)

The health fraud racket. 28 min. color. Food and Drug Administration. (Obtain from Public Health Service Audiovisual Facility, Atlanta, Georgia 30333.)

World of plenty. New York State Department of Health, 84 Holland Avenue, Albany, New York, 12208.

SLIDE SET

How food affects you. Slide set C-156. U.S. Dept. of Agriculture, Washington, D.C. 48 slides, $5.50.

POSTERS

Foods to eat. New York State Department of Health.

Guide to good eating. National Dairy Council.

TABLES OF CALORIC VALUES OF FOOD

Calories and weight: the USA pocket guide. Home and Garden Bulletin No. 153. U.S. Department of Agriculture, 1968. Obtain from U.S. Government Printing Office, Washington, D.C. 20402.

Food--what for? Workbook contains a table of caloric values. Cooperative Extension. $1.00.

The nutritive value of foods. Home and Garden Bulletin No. 72. U.S. Department of Agriculture. 1964. Obtain from U.S. Government Printing Office, Washington, D.C. 20402. 25¢.

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Eppright, Pattison, & Barbour. *Teaching nutrition.* 2d. ed. Iowa State Univ. Press. Ames, Iowa. 1963.

Jelliffe, D.B. *Child nutrition in developing countries.* U.S. Public Health Service. U.S. Government Printing Office, Washington, D.C. 20402. pa. $1.25. 1968.

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Obesity and health: a sourcebook of current information for professional health personnel. U.S. Public Health Service, National Center for Chronic Disease Control, Arlington, Virginia. pa. 1967.

Recommended dietary allowances. 7th ed. 1968. National Research Council, National Academy of Sciences. U.S. Government Printing Office, Washington, D.C. $1.75.

Tanner, J.M. *Growth at adolescence.* Charles C. Thomas, Publisher, Springfield, Illinois. 2d ed. 1962.

Watson, E.H. & Iowrey, G.H. *Growth and development of children.* Yearbook Publishers, Inc. Chicago, Illinois. 3d ed. 1958.

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Mitchell, Helen. *Japanese youth are growing taller - but why?* Nutrition News (National Dairy Council) April 1965.

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Stare, F.J. & Dwyer, J. *Healthy eating for teenagers.* Health News. (April 1969) New York State Department of Health, Albany, New York.

Washbon, M.B. & Harrison, G.G. *Overweight and what it takes to stay trim.* The Yearbook of Agriculture 1969: Food For Us All. Single Copy free on request to your senator or congressman.

FILM

Growth and development in children. Associated Films, Inc., 600 Grand Avenue, Ridgefield, N.J. 07657

BOOKS AND LEAFLETS

Animal feeding demonstrations for the classroom. National Dairy Council. 30¢.
The big stretch -- a guide for teachers on teenage nutrition education. Metropolitan Life Insurance Co., New York, New York.
A source book of food practices. National Dairy Council. 15¢.
Health aspects of the school lunch program. NEA-AMA. American Medical Association, 535 N. Dearborn, Chicago, Illinois. 25¢.
Weight control source book. National Dairy Council. 15¢.